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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,403	03/01/2004	M. Selim Unlu	BU-021AX	1449
207	7590	09/06/2006	EXAMINER	
WEINGARTEN, SCHURGIN, GAGNEBIN & LEOVICI LLP TEN POST OFFICE SQUARE BOSTON, MA 02109			WILCZEWSKI, MARY A	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	<p>Application No.</p> <p align="center">10/790,403</p>	<p>Applicant(s)</p> <p align="center">UNLU ET AL.</p>	
	<p>Examiner</p> <p align="center">M. Wilczewski</p>	<p>Art Unit</p> <p align="center">2822</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 1-12 and 27-31 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-23 is/are allowed.
- 6) ☒ Claim(s) 24-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is in response to the amendment submitted on June 15, 2006.

Drawings

One sheet of replacement drawings was received on June 15, 2006. These drawings are acceptable.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al., Patent Application Publication 2001/0032977, of record, in view of Yamazaki et al., US Patent 6,335,231, newly cited.

Abe et al. disclose a method of fabricating a buried reflective layer in silicon by a method as shown in Figure 9 which comprises: providing a first silicon substrate having a silicon dioxide (A) layer on a surface thereof, providing a second silicon substrate 16, implanting hydrogen into the first silicon substrate to a predetermined depth (20) forming a boundary between the hydrogen-implanted silicon and the unimplanted silicon on either side thereof (paragraph [0059]), bonding the two substrates at room temperature (paragraph [0059]) and annealing the wafers at a temperature of 800-1100°C (paragraph [0050] and [0063]) to promote cleaving or fracturing (splitting,

destacking) of the hydrogen implanted regions 20 and to strengthen the bond (paragraphs [0051] and [0063]), separating the silicon at the hydrogen boundary thereby exposing a separated surface and then repeating the above-identified steps, i.e., providing another silicon wafer having a silicon dioxide layer thereon, implanting hydrogen into that wafer, bonding that wafer to the exposed silicon surface and separating to expose a separated surface (paragraph [0051], [0060], and [0064]). Abe et al. lack anticipation only of performing an heating step to a cleaving temperature, as recited in lines 10-16 of claim 24.

Yamazaki discloses a method of fabricating an highly reliable SOI substrate which comprises providing a first silicon wafer 101 having a layer of silicon dioxide 102 on a surface thereof (Fig. 1A), providing a second silicon wafer 104 (Fig. 1C), implanting hydrogen to a predetermined depth 103 in silicon wafer 101 thereby forming a boundary between hydrogen implanted silicon and unimplanted silicon on either side thereof, bonding the two silicon wafers together by heating to promote cleaving or fracturing of regions containing hydrogen from regions not containing hydrogen (Figs. 1C and 1D) by first heating at 400 to 600 ° to cause cleaving followed by a second heating step at 1050 to 1150 °C to strengthen the bond (col. 6, lines 16-32), separating the silicon at the hydrogen boundary thereby exposing a separated surface (Figs. 1D and 1E).

Yamazaki teaches a wafer bonding process that is very similar to that of Abe et al. Yamazaki clearly teaches to bond the wafers and to perform a first heat treatment at a cleaving temperature in order to promote cleaving of the regions containing hydrogen from those regions not containing hydrogen and to perform a second heat treatment at

a bond strengthening temperature to strengthen the bond between the two wafers. Yamazaki clearly teaches that this two-step heat treatment yields a stabilized bonding interface, which is very strong (see col. 6, lines 33-37, of Yamazaki). Therefore, it would have been obvious to one skilled in the art that the two-step heat treatment of Yamazaki could be substituted for the single annealing step of Abe et al. thereby yielding a very strong, stabilized bonding interface.

Response to Arguments

Applicant's arguments with respect to claims 24-26 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 13-23 are allowable over the prior art of record.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Wilczewski whose telephone number is (571) 272-1849. The examiner can normally be reached on Monday and Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



M. Wilczewski
Primary Examiner
Tech Center 2800